

## 4.0 Environmental Consequences

### 4.1 Introduction

The environmental consequences that would likely result from adopting any of the three alternatives are discussed in this chapter. The chapter is organized by potentially affected resources and parallels the discussion in Chapter 3. Important potential effects associated with the three alternatives are discussed for each of these resources.

As indicated in Chapter 2, under any of the alternatives (Alternatives 1, 2 or 3), consistent with SMP, TVA would consider applications from individual shoreline property owners for private water-use facilities and approvals for deed modifications using guidelines, standards or regulations in effect at the time of the application.

### 4.2 Effects on Transportation

#### 4.2.1 Highways

**Alternative 1 - No Action** – Under Alternative 1, TVA would not issue a 26a permit for the community dock, boat launching ramp, and access road, nor would TVA approve deed modifications affecting about 14 acres to allow the construction of fill, 30 home sites/structures, and associated structures. However, since development of the private land above elevation 1044-foot msl may occur in the foreseeable future without federal approval, impacts from increased traffic to or from this proposed subdivision could likely be similar to those envisioned under both action alternatives (Alternatives 2 and 3). Because these effects would occur over 5 to 10 years, as indicated below, they are expected to be insignificant.

**Alternative 2 - Applicant's Proposal** – Under Alternative 2, as a result of the proposed subdivision, additional traffic would be generated on the adjacent roadway network. The subdivision would consist of approximately 700 residences, 30 of which would be built of the TVA flowage easement land subject to deed modification. Increased traffic would result from some truck traffic during construction, as well as residents and visitors commuting to/from these new homes. The methodology, as defined by *Trip Generation*, used to determine the additional trip generation estimates is based on an independent variable (dwellings) for each particular land use (housing) for a specified day or time period (weekday). Based on several field studies of single-family housing, an estimate of approximately 6,300 vehicles per day (vpd), or 700 vehicles during the peak hour, would be added to the existing traffic on the local roadways at build-out (i.e., 5 to 10 years from now) due to the subdivision. The 30 homes on the TVA flowage easement land would contribute 270 vpd or 30 vehicles during peak hour to the project traffic volume.

The additional traffic over the next 5 to 10 years is estimated to result in approximately a 630 percent increase in average daily traffic on Sharps Chapel Road and a 93 percent increase on State Route 33. This level of analysis provides a broad overview of the predicted impact. Peak hour traffic, on the other hand, would experience approximately a 580 percent increase on Sharps Chapel Road and an 86 percent increase on State Route 33, assuming current peak hour traffic is 12 percent of the ADT. This analysis gives a more detailed prediction of impact and is similar to affects anticipated under Alternative 1. Under Alternative 2 and based on current conditions, the level of service (LOS) provided by the roadways would be reduced at full build-out. However, over a long period of time (5-10 year time frame), there is a natural progression to improve the quality of the local roadway

network by the appropriate highway department. Therefore, as traffic increases, roadway networks are also expected to be improved. Also, the increases in traffic would occur slowly over a long span of time, so that traffic conditions would not change suddenly and, therefore, would not be perceived by the user as a quick and significant change.

Direct access throughout the subdivision would be via constructed access roadways. There would be two entrances, the primary eastern entrance and a south entrance. Because the community dock and associated facilities would not be available to the general public, no traffic originating outside the development would affect the flowage easement land. Design considerations would be taken into account in addressing turning movements, radii tolerances, sight distances, alignment, intersection design, and other important features.

A large amount of truck traffic contributes to an increase in the pavement maintenance required. Also, trucks may not be loaded beyond legal load limits, must meet all safety standards, and hauling should comply with all federal, state, and local ordinances. There would be increased truck traffic during the construction phases over a 5-10 year period. The truck traffic would include borrow material transport from a site located along Sharps Chapel Road, approximately 4 miles east of the proposed development. Other truck traffic would include construction material deliveries to the site. The initial major construction of the development would occur prior to full residential development and the roadway network would be adequate to handle this traffic during cut/fill operations. The residential construction would occur incrementally over a long period of time, including the 30 homes on TVA flowage easement land, and would not likely be perceived as a significant change. Some local businesses may actually benefit from the additional traffic while the other local residences may view it as a nuisance. Therefore, with expected transportation network improvements, overall traffic effects are anticipated to be insignificant.

Possible future mitigative measures that could improve traffic, if warranted, include traffic control devices to control traffic as well as physical road improvements to increase capacity. Potential capacity improvements could include roadway realignment and addition of passing zones, intersection realignment, roadway and shoulder widening, and repaving. These measures would be imposed by various state and federal authorities, possibly including TVA, upon their review of proposals in the future. Therefore, direct, indirect, and cumulative effects on land transportation caused by Sunset Bay are expected to be insignificant.

**Alternative 3 - Applicant's Proposal With Mitigation Resulting From the Section 26a and Land Use Review** – It is expected that effects of local traffic increases attributable to Sunset Bay Subdivision, with expected improvements, would not differ under Alternative 3 compared to Alternative 2.

#### ***4.2.2 Navigation and Rail Access***

Because Norris Reservoir is inaccessible to commercial river traffic, implementation of any of the alternatives would have no effect on commercial navigation. The anticipated effects on recreational water traffic are discussed in Section 4.4.

**Alternative 1 - No Action** – Under Alternative 1, TVA would not issue a 26a permit for the community dock, boat launching ramp, and access road, nor would TVA approve deed modifications affecting about 14 acres to allow the construction of fill, 30 home

sites/structures, and associated structures. Alternative 1 would have the least impact on navigation because TVA would not have to place additional boat hazard markers in the area, and there would be less chance for harm to recreational boaters or damage to boats.

**Alternative 2 - Applicant's Proposal** – Alternative 2 would likely have the greatest impact on navigation. The number of potential waterfront lots would be reduced somewhat (by 19 total lots) because of lot layout redesign on the peninsula deed modification areas and access restrictions within the proposed community dock harbor limits. About one-half of the 239 waterfront lots would be located along Lost Creek above mile 3. Assuming, after a case-by-case review, Section 26a permits are issued in the future for the waterfront lots, some of these waterfront lots would have boating access at locations where shallow waters expose numerous rock outcroppings. Of the 239 lots, the 30 lots on the peninsulas where deed modifications are proposed would likely have deeper water fronting them. Not all of these outcroppings are currently marked with boat hazard markers. As development occurs on the site, there would probably be a need to mark additional hazardous locations in Lost Creek.

The community dock is located at about mile 3.2 in a location away from the marked hazardous areas. If the boaters using the community slip motor into the main portion of Norris Reservoir (Clinch River), there would likely be less impact on navigation than if boaters remain largely in Lost Creek embayment. Because of existing hazards in Lost Creek, most boaters would likely use surface waters outside the embayment. As indicated in Section 4.4, the boat traffic from the Sunset Bay development when added to the existing traffic could cause a density on weekend days and holiday weekend days to be 14 acres per boat and 10 acres per boat, respectively (Scenario 2). When the reasonably foreseeable future private docks are also added to the mix, the density could increase to 13 acres per boat and 9 acres per boat, respectively (Scenario 4). Therefore, under Alternative 2, negative affects on navigation in Lost Creek embayment itself could be expected if a 336 slip community dock is approved. Assuming most boaters would motor into the Clinch River channel and disperse both up- and downstream, overall affects on navigation would be minor or insignificant.

**Alternative 3 - Applicant's Proposal With Mitigation Resulting From the Section 26a and Land Use Review** – The effects of Alternative 3 are expected to be less than Alternative 2 because 8 fewer lots would be constructed on the two peninsulas, and 11 fewer lots would have water access within the community dock harbor limits. However, as mentioned in Section 4.4 below, only 236, compared to 336 community slips would be approved.

The affects of Alternative 3 would be less when compared to Alternative 2, in regards to the effects of recreational boating on navigation. In the previously described scenario, only an additional 83 boats would be added to the total mix using Areas A and B on holiday weekend days if 236 community slips are approved. Overall, this represents higher than expected usage which would likely disperse within Areas A and B outside Lost Creek embayment. This dispersal would reduce the anticipated incremental effects of a proposed 336 slip communal dock to a level at which the impacts on navigation would not be adverse.

Because the nearest railroad is greater than 10 miles southeast of the proposed Sunset Bay site, no impacts on the railway system or access to it are anticipated.

#### **4.3 Effects on Socioeconomic Conditions**

Neither the construction of 30 additional homes nor their occupancy would have a significant socioeconomic impact on the area under Alternative 1, 2, or 3. The jobs associated with construction would be short-term and would not represent a significant portion of the area labor force. If all 30 homes were built in a single year, construction employment that year would represent less than 1 percent of Union County employment. The additional population associated with 30 new homes would be an insignificant contribution to the Union County population, amounting to less one percent. However, investments by TN Emmons over the build-out of the project (including land acquisition) and expected increases in Union County tax revenues through 2012 and beyond would have a positive effect on the area. Goods and services purchased by new residents would also benefit the local economy.

Because of the very small overall impact expected, it is anticipated that approval of this development and subsequent implementation of plans would cause no disproportionate adverse impacts on low income groups or minorities.

#### **4.4 Effects on Recreation**

TVA actions in approving the deed modification and Section 26a application could potentially affect recreation on Norris Reservoir resulting in interference with public recreational access and encouragement of increased boating traffic. Increased boating traffic would likely affect the quality of the recreation experience (i.e., increased feelings of crowding and concerns for safety; decreases in opportunities to seek high-speed thrills or develop skiing and jet ski skills; or other typical recreation outcomes sought by reservoir users). These potential impacts are discussed below.

##### Deed Modification

When TVA sold this property in 1947, the deed contained the clause “Grantor further reserves on and over that portion of the above described land which is located within a distance of 250 feet of the shoreline (“shore line” as used herein refers to the 1020-foot contour elevation) ...(A) the right for the benefit of the general public, to hunt, fish, land, and picnic; provided however, that said right shall not include overnight camping; and (B) the right to remove or prevent the construction of any buildings of further structures (except fences built on the land lying above the 1034-foot contour line...” In 1959, TVA relinquished certain rights that were retained in the original sale, but strengthened the right to flood and the right to prevent construction of structures and excavation and filling from the 1034-foot to the 1044-foot msl contours, and retained the rights discussed in (A) above. If the deed were modified, these rights for the general public would be retained and continue to exist.

##### Increased Boating Use

According to TWRA (2002a), between 1962 and 1999 registered boats in Tennessee increased from 48,341 to 314,583. The annual fatality rate per 100,000 registered boats remained fairly stable from the late 1960's through the 1970's. The rate ranged between 20 and 40 fatalities. In 1981 this fatality rate began to decrease and currently ranges from the low teens to single digits. The accident rate per 100,000 has stayed fairly constant in the range 33 to 55 from the early 1970's through 1999. The accident rate for 1999, 2000, and 2001 has been higher than the previous years: 59, 82, and 68, respectively. The injury rate per 100,000 has risen from 8.5 in 1964 to 52.3 in 2000 (and 43.2 in 2001). Across

Tennessee, Norris Reservoir had the second highest number of accidents (13) in 1999, and fourth in 2000 and 2001 with 13 and 11 accidents, respectively. The reservoir with the most accidents ranged from 15-19 during the years 1999 to 2001. Although the increase in the accident rate is likely linked more to age and alcohol than to boating density, the higher accident rate on Norris for the years 1999-2001 prompted TVA to evaluate the impacts of boating traffic in greater detail in this assessment.

In addition to safety, increased boating use affects the quality of the recreational experience. One way of assessing increased boating use is through the concept of recreation carrying capacity. Recreation carrying capacity can be defined as the amount, type, and distribution of recreation use that can occur without having unacceptable impacts on either the physical-biological resource or the recreation experience. Using a metric of boats per acre as a proxy measure for recreation carrying capacity is not a preferable, but it is an acceptable way to approach related issues. An ideal assessment would be based on geographically referenced boating counts and surveys collecting visitor perceptions of existing conditions. Data on the perceptions of boaters on Norris Reservoir regarding the recreational boating experience does not exist. In fact, among TVA reservoirs, Tims Ford Reservoir is the only one for which the experience of boaters was assessed from a study in which boaters were asked questions about their recreational experience (TVA, 2002). The Tims Ford study, as well as several previous studies, relies on three different density levels in an effort to compare people's perceptions of various crowding issues (Titre, et al., 1995). These recreation use density levels are: 10 to 15 acres per boat for high use; 15.1 to 20 acres per boat for moderate use; and 20.1 to 25 acres per boat for low use.

Titre, et al. (1995), states that their density levels should not be considered as a space standard. Rather, the upper end of the density range for the high use category (10 acres per boat) corresponds to the level that many reservoir managers use as a guideline indicating that a reservoir is becoming crowded and, therefore, may need an assessment to manage boating use. In an earlier study, the Urban Research and Development Corporation (1977) found that, on the average, the State Comprehensive Outdoor Recreation Plan standard used was 8 acres per boat and that those reservoir managers surveyed used 9 acres per boat. Because boats are bigger and more powerful today than they were in 1977 and because personal watercraft did not exist at that time, TVA feels that a conservative planning tool of 10 acres per boat could be used as a guideline indicating potential for crowding, a reduced value in the recreation experience, and an increased concern felt by boaters for their safety. However, it should be noted from the above literature review that this planning guideline is somewhat subjective since the studies are based on responses to questionnaires from boaters about their perception of what would constitute an interference with the recreational experience.

In order to estimate the impact of the proposed project at Sunset Bay on boaters' experiences, the level of current and reasonably foreseeable future use is first estimated. These estimates, i.e., maximum total number of boats likely to be in Areas A and B of the reservoir at one (i.e., the same) time, are provided below in Table 1. According to the SMI FEIS (TVA, 1998), the average width of a residential shoreline lot on Norris Reservoir is 160 feet. To estimate the number of future private docks, the "open" residential access shoreline in both Areas A and B was measured. This shoreline measured approximately 270,000 feet. This total linear footage (270,000 feet) was then divided by 160 feet, which equals an estimated 1688 total potential shoreline lots. From this number of lots, 1688, the 372 existing permitted docks (slips) are subtracted. Under this scenario, as many as 1316 future private docks could potentially be constructed. However, it is not likely that this

many private docks would be constructed on this stretch of the residential shoreline in the future. In the past 10 years, largely because of subdivision developments such as Norris Shores and Tanglewood, as well as additional more recent home construction in Sugar Camp, Lakeland, Lakewood Forest, and Tumbling Run Subdivisions, TVA has issued 270 Section 26a permits for private docks in the study area. A few hundred acres of shoreland near Tanglewood Subdivision was recently purchased and the new owners plan to develop it. However, other than Sunset Bay, TVA is unaware of any other substantial subdivision development proposed in the study area in the near future. TVA has assumed for purposes of this cumulative impact analysis that a similar growth pattern will continue in the area during the next 10 years resulting in an additional 270 private docks. More realistically, because of topographic, water depth, or other physical characteristics of the shoreline, lack of road access, ownership patterns, or the possible presence of sensitive resources, it is more likely TVA would receive requests for and approve fewer than the projected 270 docks.

<b>Table 5. Estimated Total Boat Storage and Launching Capacity of Boats Now and Future Potential in Areas A and B</b>						
	<b>Existing Use</b>			<b>Projected Future Use</b>		
					<b>Sunset Bay Shoreline Development</b>	
	<b>Existing Marinas</b>	<b>Existing Public Ramps</b>	<b>Existing Private Docks</b>	<b>Future Private Docks</b>	<b>Community Dock Boat-slips</b>	<b>Private Water-use Facilities</b>
<b>Estimated number of boats</b>	1300	170	372	270	336	239

**Alternative 1 - No Action** – Under Alternative 1, TVA would not issue Section 26a permits for the community dock, boat launching ramp, and access road, nor would TVA approve deed modifications affecting about 14 acres to allow the construction of fill, 30 home sites/structures, and associated structures. As a result of denial of the proposed deed modifications, no loss of public recreational use opportunity along the TVA flowage easement land would occur. However, under this alternative, development of back-lying, private property above elevation 1044-foot msl could likely still proceed. There would be the normally expected amount of new future boating from private docks added to the existing mix. Because this is privately owned, open, residential access shoreline and, in accordance with the SMP (TVA, 1998) categorized as Residential Mitigation in the Norris Plan (TVA, 2001), TVA would consider future Section 26a permit requests from property owners at Sunset Bay for private water-use facilities using guidelines, standards, or regulations in effect at the time of submittal of the application.

Under the No Action Alternative, it is expected that the boating activity in Areas A and B could result in boating density of approximately 9 acres per boat on a holiday weekend day (Table 7, Scenario 5). Under this alternative, boaters would likely have a number of years before overall use (including weekdays) in Areas A and B increased from a moderate to high use. It is usually when use attains the high-density range that previous studies have found a substantial increase in boaters (1) expressing concerns for safety, (2) exhibiting avoidance behavior (staying away from certain areas of the reservoir), and (3) experiencing levels of dissatisfaction in the quality of the recreational experience.

**Alternative 2 - Applicant's Proposal** – Adoption of Alternative 2 would allow construction of the community water-use facilities, establishment of harbor limits below elevation 1020-foot msl, an access road, and a deed modification for fill, excavation, and structures below elevation 1044-foot msl affecting 14 acres of the TVA flowage easement land. Also, under this alternative, consistent with its SMP (TVA, 1998), TVA would review the proposed future 239 waterfront lots of Sunset Bay as well as a projected 270 future Section 26a applications for water-use facilities in Areas A and B over the next 10 years. The NEPA reviews associated with these future requests for water-use facilities would allow TVA to continue to assess the impact of these facilities on the recreational experience.

The public presently has access to hunt, fish, land and picnic below elevation 1044-foot msl on the flowage easement land. Approval of the deed modification could interfere with people seeking access to the shoreline and impact their recreational use opportunities; however, the right would continue to exist. Although this right of access exists throughout Norris Reservoir, this strip of TVA flowage easement land between 1044-foot msl and the shoreline is seldom used by the public. Members of the public may not often use TVA flowage easement land because of the close proximity of some dwellings, as well as the location and size of some approved private facilities. Without deed modification, the topography (contours) of the land, particularly on the peninsulas, could keep the proposed dwellings far enough away from the shoreline to encourage public use of the land adjacent to the shore. Even if the public does presently use this property, the loss of this opportunity is considered insignificant because of the relatively short length of flowage easement and the availability of other TVA-owned public land on the reservoir.

The other consideration from the perspective of recreation impacts is the increase in boating traffic. The following conservative assumptions are used to develop likely scenarios of boating use:

1. On an average summer weekend day, no more than 25 percent of marina boats would likely be on the water at one time and at the same time.
2. On an average summer weekend day, no more than 35 percent of the capacity of existing public ramps would likely be used at one time.
3. On an average summer weekend day, no more than 30 percent of the existing dock owner boats would likely be on the water at one time.
4. On an average summer weekend day, no more than 30 percent of the boats from the Sunset Bay community dock slips would likely be on the water at one time.
5. On a holiday weekend day, no more than 35 percent of marina boats would likely be on the water at one time.
6. On a holiday weekend day, no more than 35 percent of the boats from existing private docks and Sunset Bay community slips would likely be on the water at one time.
7. On a holiday weekend day, 100 percent of the capacity at the existing public ramps would likely be used at one time.

Based on the data and assumptions, the potential numbers of boaters for hypothetical scenarios were derived as shown in Table 6.

<b>Table 6. Estimated Boats at One Time From Various Reservoir Facility Types in Areas A and B</b>							
	<b>Existing Use</b>			<b>Projected Future Use</b>			
					<b>Sunset Bay Shoreline Development</b>		
	<b>Existing Marinas</b>	<b>Existing Public Ramps</b>	<b>Existing Private Docks</b>	<b>Future Private Docks</b>	<b>Community Dock Boat-slips w/ 336 slips</b>	<b>Private Water-use Facilities</b>	<b>Community Dock Boat-slips w/ 236 slips</b>
<b>Average Weekend Day</b>	325	60	112	81	101	72	71
<b>Holiday Weekend Day</b>	455	170	130	94	118	84	83

<b>Table 7. Scenarios Representing Different Boating Use Levels in Areas A and B by Weekend Day and Holiday Weekend Day and Number of Acres per Boat</b>		
	<b>Weekend day Boats and Number of Boats Per Surface Acre</b>	<b>Holiday Weekend day Boats and Number of Boats Per Surface Acre</b>
<b>Scenario 1 (Existing use)</b>	497 boats (19 acres/boat)	755 boats (13 acres/boat)
<b>Scenario 2 (Existing use and Sunset Bay Private Water-use Facilities and 336 Community Slips)</b>	670 boats (14 acres/boat)	957 boats (10 acres/boat)
<b>Scenario 3 (Existing use and Sunset Bay Private Water-use Facilities and 236 Community Slips)</b>	640 boats (15 acres/boat)	922 boats (10 acres/boat)
<b>Scenario 4 (Existing use and Projected Future Private Docks Outside Sunset Bay)</b>	578 boats (17 acres/boat)	849 boats (11 acres/boat)
<b>Scenario 5 (Existing use, *All Future Docks, and Sunset Bay With 336 Community Slips)</b>	751 boats (13 acres/boat)	1051 boats (9 acres/boat)
<b>Scenario 6 (Existing use, *All Future Docks, and Sunset Bay With 236 Community Slips)</b>	721 boats (13 acres/boat)	1016 boats (9 acres/boat)

\*All future docks includes both existing private docks and projected future Sunset Bay private water-use facilities.



Combining the numbers of boats that could originate from various reservoir access sites (i.e., facility types) within Areas A and B allows the assessment of the incremental impact of the additional community dock slips at Sunset Bay.

In this analysis the density (i.e., acres per boat) is based on the surface acres of Areas A and B at full summer pool elevation of 1020-foot msl. This is the target level of Norris Reservoir on June 1 each year. From June 1 until August 1, Norris Reservoir could be as low as elevation 1010-foot msl and still be within the acceptable range for this reservoirs' operating guide. At elevation 1020-foot msl, Norris has 34,200 surface acres (TVA, 1954). At elevation 1010-foot msl, Norris Reservoir has 30,300 surface acres. Therefore, by August 1, there could possibly be 11 percent fewer acres of boating surface area during some years, which could compound the boating density issue. This reduction in reservoir surface area has occurred in 3 of the last ten years. In August, as the reservoir is drawn down below elevation 1010-foot msl to increase storage capacity, recreational boating use drops from its peak use in July.

Collectively, the existing boat traffic from various access sites in the Sunset Bay study area could cause the density on weekend days and holiday weekend days to be about 19 acres per boat and 13 acres per boat, respectively (Table 7, Scenario 1). When the reasonably foreseeable future private docks, i.e., projected future private docks, are also added to the mix without the Sunset Bay development, the density could increase to about 17 acres per boat and 11 acres per boat, respectively (Table 7, Scenario 4).

Under Alternative 2, the boat traffic from Sunset Bay when added to the existing traffic could cause a density on weekend days and holiday weekend days to be about 14 acres per boat and 10 acres per boat, respectively (Table 7, Scenario 2). When the reasonably foreseeable future private docks are also added to the mix, the density could increase to about 13 acres per boat and 9 acres per boat, respectively (Table 7, Scenario 5).

Also, under Alternative 2, TN Emmons proposes to construct a boat ramp with a 20 percent slope at the community dock site. TVA has typically recommended a slope of 12 to 14 percent in reviewing Section 26a applications for private water-use facilities since higher slopes could increase the likelihood of accidents due to difficulties in seeing the boat trailer when backing it into the water and the need for powerful vehicles to tow heavy boats up a steep slope. In Wilson (1989), the author states that "launching ramps should have a 12 to 15 percent slope [grade] for ease in launching and retrieval. Although some states prefer the grade below average water level to be as steep as 20 percent, this is a problem if water levels fluctuate. If the water drops to such an extent that the towing vehicle backs onto the steeper portion of the ramp, retrieving a boat and trailer can be difficult. In fact some vehicles may not be able to pull a loaded boat trailer up a 20 percent grade." Under Alternative 2, TVA would recommend that appropriate signage be placed at the ramp to inform users of the existence of the 20 percent grade and to encourage them to take all necessary precautions to ensure safe operation at the ramp.

Moreover, the question of the feasibility of the community dock facility must also be given due consideration. Under Alternative 2, the applicant has proposed to build 336 covered slips: 88 permanent slips with an additional 248 slips added each spring and removed each fall. Moving 248 covered slips twice every year to an upland location where they can be dry-stored would likely be destructive to the structural integrity of the slip sections, not to mention the additional maintenance expense that would be borne by the home owners association. Additionally, delays or failure to transport these slips upland during reservoir

drawdown would result in these slips lying in the reservoir drawdown zone impacting reservoir operations. Furthermore, temporary slips are likely to become detached during inclement weather creating the likelihood that these loosely floating structures could cause damage to surrounding structures or pose hazards to navigation. Accordingly, TVA prefers to permit the community dock with as many slips as are permanent and can remain afloat during the winter drawdown (see Alternative 3).

In 1999, during public scoping for the Norris Land Management Plan (TVA, 2001), 74 percent of respondents felt that no new commercial marinas were needed on Norris Reservoir. There are a few existing full-service commercial marinas in Areas A and B that provide services beyond boating access and mooring. Under Alternative 2, TVA would ensure that TN Emmons' proposed multiple slip community dock does not develop operational characteristics of commercial marinas in the vicinity and elsewhere on Norris Reservoir. Therefore, at Sunset Bay's community docks, fuel sales, boat/motor repair or sales, materials or provision sales, and other amenities typically provided by commercial marinas would be prohibited.

**Alternative 3 - Applicant's Proposal With Mitigation Resulting From the Section 26a and Land Use Review** – Under this alternative, the Section 26a permit would be issued with conditions addressing navigation considerations identified during the Section 26a review. Specifically, no more than 236 boat slips would be permitted and the boat launching ramp would be constructed at 20 percent slope, but signs would be posted warning users of potential hazards. In regard to public access and future recreational use opportunities on the TVA flowage easement land, the effects of adoption of Alternative 3 would not differ from those of Alternative 2. Also, as described under Alternative 2, under SMP (TVA, 1998), TVA would review Section 26a applications from the proposed future 239 waterfront lots of Sunset Bay as well as a projected 270 future Section 26a applications for water-use facilities in Areas A and B.

TN Emmons originally proposed to construct its 336-slip community dock in three stages based on growth of the subdivision and demands of its residents. Upon completion of Stage I, the boat slips would accommodate 48 small watercrafts and measure 54 feet wide by 286 feet long. During each of Stages II and III, an additional 144 slips could be added in each stage. After full build-out, TN Emmons planned to leave 88 slips on the water surface at winter drawdown and have the remainder removed to dry-storage for 8 months. However, TVA identified a number of concerns about this original proposal which included the impracticability of moving slips to dry storage on a schedule that matches reservoir drawdown and other physical limitations of the proposed dock locations. Under Alternative 3, TVA evaluated an additional option under which TN Emmons' has now proposed summer and winter configurations of 236 and 118 slips, respectively (see Section 1.2 Purpose and Need). With this number and configuration of slips, the potential impacts on boating traffic and boating safety would be the same as those associated with Alternative 2. The boat traffic from the Sunset Bay development when added to the existing traffic would cause the density on weekend days and holiday weekend days to be 15 acres per boat and 10 acres per boat, respectively (Table 7, Scenario 3). When the reasonably foreseeable future private docks are added to the mix, boater numbers increase to 13 acres per boat and 9 acres per boat, respectively (Table 7, Scenarios 5 and 6).

TN Emmons' proposes to construct the communal access boat ramp nearly on present grade (i.e., at a 20 percent slope) (see Section 1.2 Purpose and Need). TVA typically recommends to Section 26a applicants a launching ramp slope of 14 percent. Slopes

greater than 14 percent present a higher risk of accidents when launching and retrieving bigger boats, particularly with smaller vehicles. TN Emmons' would construct a community boat ramp with a 20 percent slope, but would also include appropriate signage at the ramp to inform users of the existence of the 20 percent grade and to encourage them to take all necessary precautions to ensure safe operation at the ramp.

As to impacts on the integrity of the community dock facility, Alternative 3 would help preserve the integrity of the boat dock and slips compared to the original proposal since they would be designed and configured to better fit into the cove's physical dimensions. Because the dock walkway would be extended outward as the reservoir is drawn down, the slips permitted (a maximum of 236 in summer; reconfigured to a maximum of 118 in winter by folding the hinged collapsible walls against the walkway) would remain afloat when the reservoir water level fluctuates. Since Norris Reservoir was at or close to elevation 975 msl part of the wintertime during 4 of the last 9 years, the possibility exists that a few of the 118 slips could be very shallow or on the reservoir bottom during this time, resulting in a marginal impact on reservoir operations. Even so, this impact would be less than that originally envisioned since slips would not have to be transported to upland areas and dry-stored in the winter. There would also be a corresponding reduction in the possibility of slips breaking away from the dock and becoming floating or underwater navigation safety hazards when compared to the previous design.

#### **4.5 Effects on Biological Resources**

Much of the shoreline habitat along the Lost Creek embayment of Norris Reservoir between miles 0.0 and 6.0 is publicly owned by TVA or is former TVA land that has been transferred to the state of Tennessee, i.e., Chuck Swan WMA and Big Ridge State Park (opposite CRM 103 downstream of Sunset Bay). Big Ridge State Park occupies land on the opposite shore at CRM 103L. A few private docks or commercial marinas, i.e., Andersonville Boat Dock, Hickory Star Marina and Campground, and Lakeview Marina, as well as Lost Creek Campground, exist within about 10 river miles of TN Emmons' proposed Sunset Bay development. Much of the area is rural with some small, scattered, shoreline, residential development (subdivisions) and some forestland and agriculture, mostly in the form of pasture. Compared to Sunset Bay, other residential shoreline developments on Norris Reservoir of a similar or smaller scale include Lone Mountain Shores, Norris Crest, Norris Shores, Tanglewood, Sugar Camp, Lakeland, Lakewood Forest, and Tumbling Run Subdivisions, and Woodlake golf community. Terrestrial habitats on TVA fee owned land and state public lands in the area are expected to be protected over the long term. There are currently few other ongoing activities that may cumulatively affect resources impacted by the Sunset Bay development. Overall, effects on common terrestrial species and habitats, including the 14-acre deed modification area, would be insignificant on a local and regional basis. Thus, significant cumulative effects on biological resources are not expected.

##### **4.5.1 Terrestrial Effects**

**Alternative 1 - No Action** – Under Alternative 1, all 30 homes and associated structures, excavation, or fill must remain above the 1044-foot contour elevation (TVA flowage easement) over the entire 1000-acre project area. The horizontal ground distance between elevations 1020-foot msl (full summer pool level) and 1044-foot msl ranges from a minimum of 45 feet to a maximum of 1222 feet; it averages 232 feet (see Figure 10).

Vegetation between elevation 1044-foot msl and elevation 1020-foot msl may be removed or altered as the landowner desires unless the alterations are connected to a permit request for water-use facilities. Most of the terrestrial habitat below elevation 1044-foot msl is now in grassland with scattered solitary and groups of mature trees that do not obscure a clear view of the lake. Future terrestrial habitat below elevation 1044-foot msl will most likely be mowed lawns with removal of some mature trees and tree snags, as well as landscape plantings of shrubs and smaller trees. Effects on common terrestrial species and their habitats should be insignificant on a regional basis.

TVA would consider requests from individuals for private water-use facilities consistent with SMP (TVA, 1998) requirements. Under the SMP, TVA reviews each individual request to determine the potential to affect endangered, threatened, or special status species. Any permit request with the potential to adversely affect these species would be modified or denied so that protected species would not be adversely affected. Alternative 1 would have the least impact on terrestrial ecology.

**Alternative 2 - Applicant's Proposal** – Alternative 2 would distribute more terrestrial habitat than Alternative 1. The construction of certain facilities, excavation, fill, and tree cutting below elevation 1044-foot msl would disturb a minimum of 14 acres of terrestrial habitat on the TVA easement area. Additional private land on the upland above elevation 1044-foot msl would be disturbed by construction and occupancy of homes. However, because of the abundance of similar habitat in the area and region, the effects of this loss would be insignificant.

#### Threatened and Endangered Species

The federally listed endangered gray bat and Indiana bat may occur in the project vicinity. Three federally threatened bald eagles were observed on the Sunset Bay project site in April, 2002. The USFWS has requested that these areas be assessed for potential impacts to federally endangered Indiana and gray bats. An assessment of gray and Indiana bat habitat suitability and potential impacts to bald eagles was conducted by BHE was submitted to USFWS on May 1, 2002 (Appendix A). This assessment included a review of published literature, and state and TVA natural heritage data for the 1000-acre project area and surrounding vicinity. An on-the-ground survey was conducted for 115 acres of the property, which includes the 14-acre area potentially affected by the federal undertaking. Results of this assessment are as follows:

- No caves exist within the surveyed areas that would provide suitable summer roosting or winter hibernating habitat for gray bats.
- No caves exist within the surveyed areas that would provide suitable wintering habitat for Indiana bats.
- The proposed development activities in the surveyed areas are not likely to adversely affect gray bat or Indiana bat foraging habitat within the survey area, given the large amount of suitable habitat nearby.
- To avoid impacting Indiana bats, potential (dead or live trees greater than 6 inches dbh) bat roost trees may be removed between October 15 and March 31, when Indiana bats are not present. In the event TN Emmons seeks to remove potential bat roost trees between April 1 and October 14, a qualified biologist will be hired to

identify and mark trees within the area. A report will be provided to TVA showing the location and number of roost trees. Removal of any such trees will require a biologist to monitor these trees using an ultrasound detector to identify bat echolocation calls. This monitoring shall occur from 30 minutes before dusk to 30 minutes after dark, screening a range of frequencies from 38 to 50 kHz. If no ultrasound calls are detected during one night of monitoring, the tree will be removed the following morning. Sunset Bay Architectural Review Committee (governed by the Homeowners Association) will also require approval of any potential bat roost trees removed by individual lot owners between April 1 and October 14. Reports from such lot owner projects will be submitted annually to TVA subsequent to tree removal.

- No bald eagle nests were observed in the survey area. Because the population of eagles is increasing and suitable habitat occurs elsewhere in the area, tree removal within the survey area would not adversely affect bald eagles. The availability of perching habitat likewise, would not be adversely affected.

The BHE Environmental, Inc., surveys also identified a maximum of 28 potential Indiana bat roost trees within or adjacent to the areas under review by TVA for 26a permits or deed modifications. The proposed activities could adversely affect Indian bats if potential summer roost trees are removed when Indiana bats are present. However, if commitments to monitor potential summer roost trees are employed, the proposed project would not likely adversely affect the Indiana or gray bat (see letters from Lee A. Barclay to Amy Henry, BHE Environmental, dated May 30, 2002 and Lt. Colonel Steven W. Gay, USACE,, dated June 11, 2002 in Chapter 9). Tree and snag removal would reduce perching habitat for federally threatened bald eagles. However, given the large amount of suitable perching habitat near the project area, this species would not likely be adversely affected.

Responding to the May 1 report in a letter dated September 20, 2002, FWS indicated it could support Alternative 2 or 3 as long as its recommendations concerning the Indiana bat and gray bat contained in its May 30, 2002 letter to Amy Henry [BHE Environmental] were incorporated into the project plan. Furthermore, in its May 30 response to BHE's habitat assessment, FWS concurred that the proposed actions would not likely adversely affect the Indiana bat or gray bat as long as implementation measures to restrict time of the year or individual tree removal are incorporated. These mitigation measures are included as commitment(s) in the EA (see Chapter 9 and Appendix F).

**Alternative 3 - Applicant's Proposal With Mitigation Resulting From the Section 26a and Land Use Review** – Because the extent of development is the same, potential impacts on terrestrial habitat and federal-endangered gray and Indiana bats and federal-threatened bald eagles would be the same under Alternative 3 as under Alternative 2. As indicated in the discussion of threatened and endangered species above, potential adverse impacts to Indiana bats would be mitigated if removal of potential roost trees is restricted to the October 15 to March 31 time period. Alternatively, as indicated in Alternative 2, individual tree monitoring, to avoid impacting Indiana bats, would occur (Commitment No. 6).

#### **4.5.2 Aquatic Effects**

Impacts to aquatic resources are directly related to changes of the existing shoreline conditions. Aquatic resources can be impacted by changes to shoreline (riparian) vegetation, vegetation on back-lying land, and land uses. Shoreline vegetation (particularly

trees) provides shade, organic matter (a food source for benthic macroinvertebrates), and shoreline stabilization, and trees provide aquatic habitat (cover) as they fall into the reservoir. Shoreline vegetation and vegetation on back-lying land provide a riparian zone which functions to filter pollutants from surface runoff while stabilizing soils. Therefore, there would likely be some minor degradation of aquatic habitats associated with development along the reservoir shoreline under any of the alternatives.

Preservation of a natural shoreline condition to the extent possible on TVA land is important on Norris Reservoir because such a large percentage of the back-lying property is in private ownership and, therefore, subject to development. Although much of the private land is presently undeveloped, future development could greatly alter the character of much of the reservoir shoreline that is not controlled by TVA. Shoreline development can alter the physical characteristics of adjacent fish and aquatic invertebrate habitats, which can result in dramatic changes in the quality of the fish community. One of the most detrimental effects of shoreline development is the removal of riparian zone vegetation, particularly trees. Removal of this vegetation can result in loss of fish cover and shade, which elevates surface water temperatures. Also, fish spawning habitat, such as gravel and woody cover, can be rendered unsuitable by excessive siltation and erosion. This can occur when riparian vegetation is cleared (TVA, 1998). Additionally, shoreline development often results in the removal of existing aquatic habitat (i.e., stumps, brush, logs, boulders, etc.) in association with the construction of water-use facilities.

**Alternative 1 - No Action** – Under Alternative 1, TVA would not issue a Section 26a permit for the community dock, boat launching ramp, and access road, nor would TVA approve deed modifications affecting about 14 acres to allow the construction of fill, 30 home sites/structures, and associated structures. Under this alternative, development of back-lying property above elevation 1044-foot msl could likely still proceed, and TVA would consider future permit requests for individual private water-use facilities. As a result, riparian woody vegetation would be reduced at some sites where trees on the shoreline would be cleared for water-use facilities. In some cases, clearing of trees and brush may accelerate shoreline erosion, resulting in the placement of riprap or other shoreline stabilization (which would likely also be requested at locations where the shoreline is presently eroding). Impacts would be less on shoreline sites where woody vegetation is presently absent or sparse; in fact, aquatic habitat can actually be improved by placement of riprap or construction of fixed docks on some of these sites. Impacts to aquatic resources would be insignificant with implementation of permit commitments to use BMPs, minimize vegetation removal and shoreline and lakebed disturbance, and to properly construct stabilization structures.

**Alternative 2 - Applicant's Proposal** – Adoption of Alternative 2 would allow construction of the community water-use facilities, establishment of harbor limits below elevation 1020-foot msl, an access road, and deed modifications for fill, excavation, and structures below elevation 1044-foot msl affecting 14 acres of the TVA flowage easement land. Although individually reviewed, this could also result in disturbance of shoreline vegetation to construct individual water-use facilities; but impacts would be the same as under Alternative 1.

Placement of fill and construction of housing below elevation 1044-foot msl on the deed modification areas would result in additional erosion runoff of soil during construction and runoff of lawn maintenance chemicals during establishment and maintenance of lawns and ornamental vegetation. Sewage volume would also increase due to construction of additional homes. Deed modifications would also result in additional storm water runoff

from streets, as well as parking areas and other paved surfaces. However, because these impacts would be local, temporary, or minor in nature relative to the amount of near-shore habitat available throughout the reservoir, these effects are expected to be insignificant.

The aquatic impacts resulting from construction and use of the community dock and other community facilities could be further reduced with implementation of measures to minimize effects. Runoff from areas of soil disturbance as a result of construction, on-site borrow activities, or fill placement, can be reduced compared to Alternative 2 with implementation of BMPs to reduce erosion. Entry of chemicals and fertilizers into the reservoir can be reduced by maintenance of a vegetated buffer on TVA flowage easement land. Effects resulting from sewage would be reduced to insignificant levels by proper handling and treatment of sewage in accordance with state and local regulations. Storm water impacts can be further reduced by construction and maintenance of suitable structures for channeling and holding runoff prior to it entering the reservoir. See Section 4.7 for discussion of other water quality abatement measures associated with TDEC's General NPDES Permit for Storm Water Discharges Associated with Construction Activity and its §401 Water Quality Certification/Tennessee Aquatic Resource Alteration Permit (also see Chapter 9 and Appendix F).

Measures to minimize aquatic impacts would include:

- Equipment movement and maintenance would be kept to a minimum on the TVA shoreline while conducting excavations and construction.
- Except for sudden fluctuations in the reservoir water level, any excavation and construction in the drawdown zone would be conducted in the dry during reservoir drawdown.
- Removal of vegetation would be minimized, particularly any woody vegetation presently providing shoreline stabilization.
- BMPs would be used throughout the project to prevent the introduction of soil or any other pollutants into the reservoir, including immediate revegetation or other stabilization of disturbed areas.
- Rock used for stabilization would be large enough to prevent washout while providing good aquatic habitat.
- Wet cement contact with the reservoir is to be avoided.

**Alternative 3 - Applicant's Proposal With Mitigation Resulting From the Section 26a and Land Use Review** – Under this alternative, the extent of development is expected to be the same as that described for Alternative 2. The same commitments as described in Alternative 2 would be implemented under Alternative 3 to minimize aquatic impacts. Because of higher activity (e.g., emission of pollutants from boating and other use) that would occur at the community dock under Alternative 2 (336 slips) compared to Alternative 3 (236 slips), aquatic impacts are expected to be less under this alternative.

Development of the reservoir shoreline is likely to continue under either alternative. However, standards implemented in accordance with TVA's permitting policies in effect at

the time of future construction would reduce aquatic impacts to insignificant levels by providing improved protection for existing natural shoreline conditions. Because aquatic habitat on Norris Reservoir can be considered only “fair” overall, impacts to aquatic habitats is a primary consideration in any future decision. This would be the case under either alternative action affecting TVA flowage easement land or the reservoir.

#### **4.5.3 Effects on Wetlands**

Under any of the alternatives (Alternative 1, 2, and 3), no wetland loss would occur as a result of the proposed community dock, boat launching ramp, or deed modifications and fill below the 1044 foot contour to allow construction of about 30 residential dwellings and parking lot. Similarly, no wetlands would be affected by the use of the proposed offsite soil borrow area.

**Alternative 1 - No Action** – Under Alternative 1, TVA would not issue a Section 26a permit for the access road and there would be no wetland impacts from road construction. Under Alternative 1, TVA would consider requests from individuals for private water-use facilities consistent with SMP (TVA, 1998) requirements. Under the SMP, TVA reviews each individual request to determine the potential to affect wetlands. Any permit request with the potential to adversely affect wetlands would be modified or denied so wetlands would not be adversely affected. Under this alternative, construction of the east entrance road where the 0.25-acre wetland is located would be denied. Therefore, adoption of Alternative 1 would not result in adverse affects on wetland resources from a local or regional perspective.

**Alternative 2 - Applicant’s Proposal** – Under Alternative 2, construction of the east entrance road would result in placement of fill material in 0.25-acre of emergent wetland and could potentially result in a net loss of wetlands on Norris Reservoir (Figure 11). As described in Section 3.5.3, this would adversely affect the functions and values associated with this wetland area. However, TN Emmons would mitigate the adverse affects of this loss. Options considered to mitigate this wetland loss were: 1) onsite wetland creation, 2) restoration or enhancement of other wetland systems the Sunset Bay property or 3) purchase of wetland mitigation credit from an acceptable bank.

After considering these options, TN Emmons proposes to mitigate wetland loss through acquisition of a 0.50-acre credit. TVA and USACE concur on the mitigation ratio and that the purchase of the wetland credit would be an acceptable strategy for mitigating the impacts to wetlands. The applicant would purchase a 0.50 acre (2:1 ratio) wetland credit from the Indian Creek Wetland Mitigation Site owned by Wetland and Environmental Technologies of Tennessee, LLC (Appendix C). The mitigation bank has been approved for use by TDEC, TWRA, USACE, USEPA, and USFWS. It is located in Roane County, Tennessee, approximately 40 miles from the wetland fill site at Sunset Bay. The purchase of this wetland mitigation credit would offset the 0.25-acre wetland loss and, therefore, effects of this loss would be insignificant on a regional basis. This satisfies the provisions for TVA implementation procedures for Executive Order 11990 (Protection of Wetlands) and USACE’s Section 404(b)(1) guidelines evaluation (see Section 1.4 Purpose and Need and Appendix D).

In addition, the developer has moved the east entrance road to minimize its affect on TVA flowage easement land below elevation 1044-foot msl, including the wetland area, and TVA fee land below elevation 1020-foot msl. Here, TN Emmons would remove the old road fill



material and identify the original elevation 1020 msl contour (Figure 15). Approximately 141 cubic yards of old fill material lies within this area and its removal will balance the net amount of new fill below elevation 1044 msl and possibly restore a small amount of power storage volume below elevation 1020 msl.

**Alternative 3 - Applicant's Proposal With Mitigation Resulting From the Section 26a and Land Use Review** – Road construction under Alternative 3 would result in the same wetland loss as described in Alternative 2, i.e., the same loss of 0.25-acre site. Under Alternative 3, the impact would also be mitigated through the purchase of 0.5 acres of wetland credit at the Indian Creek Wetland Mitigation Site (see contract in Appendix C).

#### **4.6 Effects on Air Quality**

Residential developments usually involve emissions of air pollutants limited to fugitive dust, exhaust fumes from vehicles and equipment, and the handling and/or disposal of routine solid construction waste through open burning. Little of these activities would likely occur directly on the areas subject to federal approval. Since no unusual or special substances would be handled or disposed on site, and no hazardous air contaminants would be used, handled, or disposed on site, the project is not expected to adversely impact the local or regional air quality. Reasonable precautions would be employed to control fugitive emissions, e.g., dust, fumes, smoke, etc., and waste would be properly disposed.

The expected increased volume of vehicular and recreational boat traffic as well as other activities, such as outdoor burning of some vegetation and minor amounts of appropriate construction waste, that would result from approval of either action alternative would result in minor amounts of smoke and exhaust emissions. Outdoor burning would be conducted in accordance with the state of Tennessee's open burning regulations and only after appropriate permits are obtained from the Tennessee Division of Forestry.

Given the good existing ambient air quality conditions, impacts are expected to be temporary during construction and otherwise minor and locally and regionally insignificant. Air quality impacts are expected to be minor or insignificant under any of the alternatives (Alternative 1, 2, or 3) (see letter from TDEC, Division of Air Pollution Control in Chapter 9).

#### **4.7 Effects on Water Quality**

##### **4.7.1 Norris Reservoir Water Quality**

Potential impacts to water quality include increased loading of pollutants in runoff due to the change in land use and discharge of sediment during construction and from fill and any on-site borrow areas. An increase of nutrient loading could contribute to higher algal mass in Norris Reservoir, which could in turn lead to decreased dissolved oxygen in the main reservoir during periods of stratification and/or decreased dissolved oxygen in the Lost Creek embayment during periods of low local flow. Increases in sediment discharge contribute to the muddy appearance of the water and interfere with the quality of aquatic habitat, and toxic materials (such as metals, hydrocarbons, and pesticides) in storm water runoff from residential areas can be toxic to aquatic organisms.

TN Emmons has submitted a Storm Water Pollution Prevention Plan (SWPPP) to the state of Tennessee for this project. In shoreline and other upland areas subject to erosion, TN Emmons would use silt fences, check dams, and use other appropriate BMPs during construction to prevent soil erosion and soil runoff deposition into Norris Reservoir. Under

any of the alternatives, TN Emmons would comply with the provisions of TDEC Rule 1200-4-10-.05 and its General NPDES Permit for Storm Water Discharges Associated with Construction Activities for all site grading, storm water management, and installation of erosion/sedimentation control facilities on the property. The developer would also comply with the special conditions of its §401 Water Quality Certification/Tennessee Aquatic Resource Alteration Permit (Appendix B shows the TDEC approval under NPDES permit number TNR100000 and the WQC/ARAP). Following construction, all shoreline lots would be over-planted with vegetation to minimize erosion, protect water quality, and preserve aquatic habitat (see Chapter 9 and Appendix F). This EA incorporates by reference impact minimization provisions of the SWPPP.

**Alternative 1 - No Action** – Under Alternative 1, a permit for the community dock, boat launching ramp, or access road would not be issued, nor would TVA approve deed modifications to allow the construction of fill, 30 homes, and associated structures. Under this alternative, development of back-lying property above the elevation of 1044-foot msl would likely proceed, and TVA would consider future permit requests for individual private water-use facilities. This would allow dispersed, private access at multiple points and cause some local construction erosion impacts.

Since nutrient loading from pasture is as high as or higher than that from low-density residential access (Reckhow, et al., 1980), the planned change in land use from pasture and woods to residential is not likely to increase the nutrient loading to the reservoir significantly. However, there would be an increase in other pollutants, such as pesticides, metals, and other toxic materials. This increase would be small and would not impact the main body of the reservoir, but may cause a slight decline in the health of the aquatic community in the Lost Creek embayment.

Construction of houses and roads, excavation for borrow, and placement of fill can cause substantial erosion. Storm runoff can transport sediment to the reservoir even from upland sites. If not controlled by implementation of adequate BMPs, this sediment could impact aquatic habitat, particularly in the embayment.

Sunset Bay would use an engineered on-site wastewater treatment system that would be managed by the local utility district. This would minimize the probability of pollution of the reservoir from wastewater.

**Alternative 2 - Applicant's Proposal** – Adoption of Alternative 2 would allow construction of the community water-use facilities, establishment of harbor limits below elevation 1020-foot msl, an access road, and deed modifications for fill, excavation, and structures below elevation 1044-foot msl, affecting 14 acres of the TVA flowage easement land.

As in Alternative 1, TVA would review future Section 26a applications for private water-use facilities on an individual basis and, therefore, affects for any future approval are expected to be similarly insignificant.

Placement of fill and construction of housing below elevation 1044-foot msl that would be allowed by deed modifications would result in additional opportunities for soil erosion during construction. Commitments to use construction BMPs on shoreline areas are included in the proposal, and their proper use would decrease this impact to minor levels. Some increase of loadings of nutrients and toxic substances associated with urban development

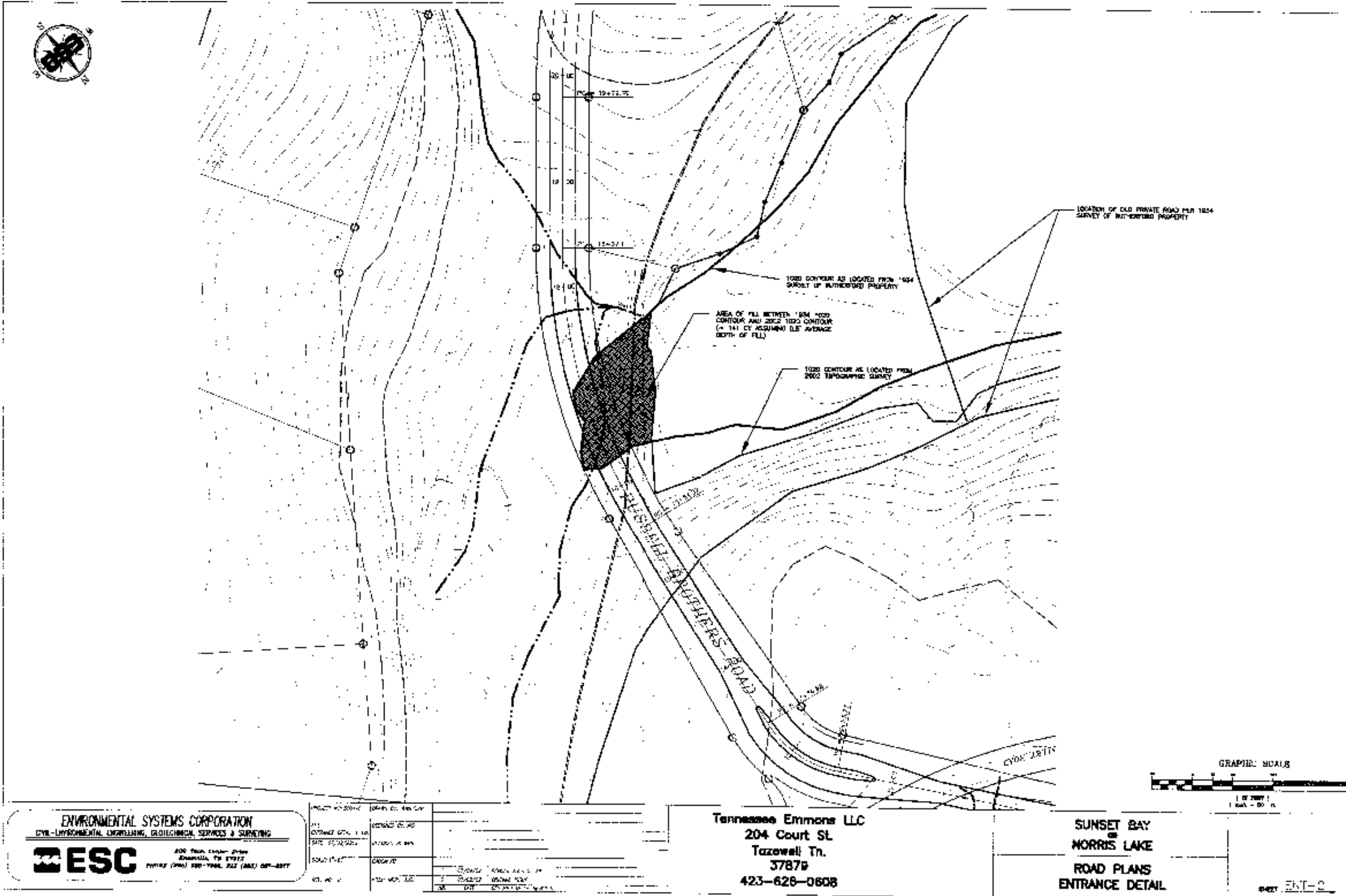


Figure 15. Sunset Bay Road Plans Entrance Detail - Location of Former and Existing Elevation 1020-foot msl and Calculated Old Fill Volume



would occur with the construction of 30 additional home sites over leaving these areas undeveloped, and these materials could likely be delivered to the embayment because of the proximity of these houses to the water. The undeveloped strip along the reservoir shoreline averages 230 feet wide between elevations 1020 and 1044 msl. Even on these deed modification areas where fill material would be allowed down to 1036, this strip is typically about 150 feet wide. Because of the small number of these houses compared to the size of the development, these impacts would be minor.

TN Emmons has committed to use appropriate BMPs to prevent erosion and sedimentation during construction “in shoreline areas subject to erosion.” This commitment also applies to construction, fill, and borrow activities in all phases and in all locations of the development.

Planting and maintaining a buffer strip of deep-rooted perennial plants along the shoreline would reduce shoreline erosion from current levels, improve aquatic habitat, and prevent some of the pollutants generated on the land from reaching the reservoir. To insure that the 20.2 acres of “40-foot-wide conservation buffers,” largely associated with uplands which drain toward Lost Creek, are designed, constructed, and maintained to prevent long-term erosion and potential water quality effects, TN Emmons would: (a) design surface storm water drainage channels using channel shape (e.g., v-shape, parabolic, trapezoidal, etc., included in the Storm Water Pollution Prevention Plan), linings (rock, grass, or permanent fabric), grade-control structures, or other methods as appropriate to withstand the increased post-development discharges, (b) insure long-term maintenance by repairing erosion that might occur to these channels, (c) connect “buffers” to other vegetated areas such as those retained or created in association with item (commitment) numbers 14 and 15 in Chapter 5, and (d) incorporate language in sales agreements that will prohibit new landowners from excavating soil or removing or damaging trees in these buffer areas. Landowner conformance with this condition would become a responsibility of the Architectural Review Committee of the Sunset Bay Homeowners Association.

TN Emmons would be subject to a variety of state and federal regulations designed to protect water quality. In addition, TN Emmons would meet additional environmental protection requirements imposed by TDEC. Sewage treatment facilities are to be built and maintained in accordance with any applicable county and state requirements. Because of the anticipated effective implementation of these measures, quality of water in this reach of Norris Reservoir would not be affected significantly (see Chapter 9 and Appendix F).

A community dock with mooring facilities for 336 boats would generate pollutants in the form of petroleum and wastewater discharges from boats. The potential impacts from these pollutants include toxicity to fish, increased nutrient loads, and bacterial contamination. The impacts from this community dock would not be significant in the main reservoir, but could have greater impacts in Lost Creek embayment and in the vicinity of the dock, particularly at high-use times of the year.

**Alternative 3 - Applicant’s Proposal With Mitigation Resulting From the Section 26a and Land Use Review** – Under this alternative, the extent of development is expected to be the same as that described for Alternative 2. The potential impacts described under Alternatives 1 and 2 would be minimized and existing impacts reduced with mitigation measures discussed under Alternative 2. Because fewer slips for the community dock would be approved under Alternative 3 (236 slips) compared to Alternative 2 (336 slips),

impacts generated from pollution discharged from boats (e.g., petroleum) would be lessened under Alternative 3.

The following mitigation measures are in addition to those identified under Alternative 2 and would ensure insignificant water quality effects.

- TN Emmons will rigorously implement BMPs prior to, during, and after establishment of construction, fill, and borrow activities in all phases of the development. In particular, any fill placed below elevation 1044-foot msl will be stabilized with at least a temporary erosion control mat planted to suitable permanent vegetation. Along the shore to the top of the wave impact zone (below elevation 1023-foot msl) at full pool, fill will be covered with riprap (rock) large enough to prevent washout. Such rock will be underlain with suitable filter fabric or granular filter. Upland property will be indefinitely maintained to prevent erosion (see Chapter 9 and Appendix F).
- At completion of construction in order to treat or remove sediment, nutrient, metals, or other potential pollutants from surface drainage prior to entering the reservoir, TN Emmons will convert temporary sediment traps or basins to permanent storm water treatment/detention structures by cleaning out accumulated sediment and planting the basins to appropriate vegetation, preferably native grasses and forbs. Any additional storm water treatment structures required by state or county requirements will be constructed in accordance with those requirements. Maintenance will become a responsibility of the Sunset Bay homeowners' organization.
- Although it would not provide services equal to a full-service marina, the developers would commit to management the community dock based on the *Tennessee Valley Clean Marina Guidebook* to address the potential water quality impacts.

#### **4.7.2 Ground Water**

Impacts on ground water from Sunset Bay would be insignificant under Alternative 1, 2, or 3. Construction techniques employed under any of the alternatives would not normally result in groundwater impacts. Also, because of the developed plans to utilize a community wastewater treatment facility and the lack of septic tanks, groundwater impacts from this source are precluded.

### **4.8 Effects on Community Infrastructure and Services**

Since private development would occur above the TVA flowage easement land under any of the alternatives, the impacts on utilities and services would be similar for any of the three alternatives. Impacts on utilities and services would occur incrementally as developed lots become occupied and resident population grows.

#### **4.8.1 Community Infrastructure**

The HPUD plans to extend an 8-inch to 12-inch water line from an existing water line that serves the Sharps Chapel Elementary School and community to the Sunset Bay area—a distance of approximately 4 miles. In addition, HPUD plans to construct a 500,000-gallon water storage tank at Sharps Chapel. These water system improvements would enable the HPUD to provide potable water service to the new subdivision.

The estimated water demand for 30 new households would be 3750 to 4500 gallons per day (based on 125-150 gallons per household per day, HPUD). Water would be purchased from the Claiborne County Utility District (CCUD), which relies on the Clinch River as its water source. The design capacity of the CCUD water system is 2.1 million gallons per day (mgd) and average daily production is 1.1 mgd. Peak production is 1.5 mgd. Therefore, capacity of the CCUD would be sufficient to meet the demands of the proposed development.

HPUD plans to build a new water intake and treatment facility on Norris Reservoir near Sharps Chapel by the year 2005. This new facility and water source would serve the Sunset Bay area; at which time, reliance on both purchased water from CCUD and the Clinch River water source to serve the development would discontinue. All water system improvements would be subject to approval by the Tennessee Division of Water Supply.

An on-site wastewater collection and treatment system is proposed for Sunset Bay. The wastewater system would consist of individual treatment units for each lot, a treated wastewater effluent collection system, and slow-rate application of treated sewage effluent to the land. The initial stage of wastewater treatment would be based on recirculating filtration technology. Following collection, treated effluent would receive ultra violet disinfection, be temporarily stored, and then sent to a drip irrigation field. The system would be designed to provide a capacity sufficient to meet the anticipated wastewater flow and treatment requirements of full development (i.e., approximately 700 homes) and occupancy. The wastewater system would be owned and operated by the HPUD. Construction and operation of the system would be contingent upon receipt of all necessary approvals (e.g., operating permit, certification of operating entity) from the Tennessee Division of Water Pollution Control.

Residential or other development of the back-lying, private land would likely proceed or occur in the foreseeable future without federal authorizations. Since the water supply and wastewater treatment systems proposed would be provided or developed and ultimately owned and operated by CCUD or HPUD, respectively, the environmental effects of these systems are expected to be very minor and the same across all the alternatives. These systems would be developed and operated in accordance with applicable county and state regulations.

An estimated 1.4 tons of solid waste per household per year (source: WMI) would be generated or an estimated 42 tons per year of solid waste would be generated from the 30 households on the 14 acres subject to the TVA deed modifications. The Chestnut Ridge facility has 35–40 years of life remaining and sufficient capacity to receive the additional waste that would be generated. Impacts of the additional solid waste generated by Sunset Bay residents would be minor because additional disposal capacity at this or a new site would likely be developed prior to build-out of this development.

The incremental difference associated with community infrastructure development to provide these services for the 30 home sites subject to deed modification and TVA approval is expected to be negligible.

#### **4.8.2 Services**

Fire and police protection and emergency medical services would be expected to be upgraded in the Sharps Chapel and Sunset Bay areas over the anticipated build-out

schedule for the development. New development would add to the county government revenue base and, in turn, to its ability to provide needed services.

Implementation of Alternative 1, 2, or 3 would be expected to have similar, if not the same, effects on fire and police protection and emergency medical and electrical services. These services would be expected to be upgraded in the area over the anticipated build-out schedule for the Sunset Bay development. New development would add to the local government revenue base and, in turn, an ability to provide needed services.

Sunset Bay would most likely add to pressures already being exerted by the overcrowded Union County School System. The degree to which the new residential development would impact the schools would depend on a number of factors. Moving new families into the area with school-aged children would add to the school population. Seasonal residents and retirees without young children would not increase the need for additional school facilities. Currently, a Union County School District committee is studying the impact of current and projected population growth on the school system and the need for expanded or new facilities. Specific recommendations or plans for expansion have yet to be developed. However, construction of new or expansion of existing schools would be expected in the area over the anticipated build-out schedule for Sunset Bay. New development would add to the local government revenue base and, in turn, an ability to provide needed services.

Implementation of Alternative 1, 2, or 3 would be expected to have similar, if not the same effects on schools. Seasonal residents and retirees without young children would not be expected to contribute to the need for more educational facilities. However, construction of new or expansion of existing schools would be expected in the area over the anticipated build-out schedule for the new subdivision. The incremental difference associated with the 30 home sites subject to deed modification and TVA approval is negligible.

#### **4.9 Effects on Cultural Resources**

Union County, Tennessee, currently has three historic properties listed in the NRHP. None of these properties are located in the Sunset Bay area and none would be affected. Surveys conducted on the Sunset Bay and TVA property resulted in the identification of eight archaeological sites. Based on the lack of intact cultural deposits and no potential to yield additional important information, these sites were found ineligible for listing in the NRHP. Therefore, existing data, along with the recent surveys, suggest that no archaeological sites or historic structures or sites recommended as either eligible or potentially eligible for listing on the NRHP are located on the affected property. Because part of the property to be occupied by the community dock was under water and could not be investigated in the initial 65-acre survey, TVA will use a phased identification and evaluation approach to complete its responsibilities under Section 106 of the NHPA.

Regardless of whether Alternative 1, 2, or 3 is chosen, further consultation under Section 106 of the NHPA would be required when future Sunset Bay shoreline property owners seek permits for individual, private water-use facilities. Also, consistent with the phased identification and evaluation approach, the developer would conduct no construction activities within the non-surveyed area proposed for the community dock harbor limits until such time as the additional survey of the shoreline (elevation 1015.6-foot msl to elevation 985-foot msl) is completed. Developer would then submit documentation of the survey to



TVA. TVA would assess the impact to historical properties in the area yet to be surveyed and coordinate its review with the Tennessee SHPO and appropriate consulting parties.

**Alternative 1 - No Action** – Under Alternative 1, TVA would not issue a Section 26a permit for the community dock, boat launching ramp, and access road nor would TVA approve deed modifications affecting about 14 acres to allow the construction of fill, 30 home sites/structures, and associated structures. Under this alternative, development of back-lying property above elevation 1044-foot msl would likely proceed, and TVA would consider future permit requests for individual private water-use facilities. Assessment of impacts to historic properties would be required under Section 106 of the NHPA at the time of TVA's review of individual private water-use facility requests.

**Alternative 2 – Applicant's Final Proposed Action** – Adoption of Alternative 2 would allow construction of the community water-use facilities, establishment of harbor limits below elevation 1020-foot msl, an access road, and deed modifications for fill, excavation, and structures below elevation 1044-foot msl affecting 14 acres of the TVA flowage easement land. Under this alternative, TVA would consult with the Tennessee SHPO to incorporate a phased identification and evaluation procedure to effectively preserve historic properties. No historic properties were identified during the surveys conducted within the TVA-determined APE; therefore, no historic properties would be affected by the east entrance road, three areas proposed for deed modifications, community dock, dock access walkway, deck, launching ramp (including all areas of placement of fill for construction and riprap for stabilization), and borrow areas.

Under Section 106 of the National Historic Preservation Act, TVA coordinated its review of the potential impact of the proposed action on historic properties, including review of a Phase I archaeological survey. Nine Indian tribes with possible affiliation with the project area were notified of the proposed action by letter dated July 24, 2002. By letter to the State Historic Preservation Officer (SHPO), dated July 15, 2002, TVA submitted a finding that no historic properties would be affected within the TVA-designated Area of Potential Effect (APE). The SHPO responded, by letter of August 21, 2002 stating: "We affirm our finding, stated in previous correspondence, that we concur with TVA's determination that there are no historic properties which will be affected in the portions of the project previously surveyed. We also repeat our concurrence that archaeological survey work in the inundated areas of the project may be postponed until the winter draw down."

Despite this concurrence, the SHPO continued to disagree regarding the extent of the APE identified by TVA for this project. Further, by letter of September 24, 2002, THC suggested that there may be historic properties as yet unknown located within the boundaries of Sunset Bay Residential Development that exist beyond the TVA-designated APE. While it is indeed possible that cultural resources exist on private lands in the area, these resources would not be affected by the federal actions related to Sunset Bay. As to the non-federal actions on private land, TVA will encourage the developer to undertake the development in a manner that would minimize the impact to historic properties.

Any additional shoreline potentially affected (between elevations 1044-foot msl and 985-foot msl) within proposed east entrance road area and harbor limits of the community dock would be subject to phased Section 106 compliance. To investigate this area, a Phase I archaeological survey would be conducted during low winter pool (minimum winter pool level).

Any future proposals for Section 26a permits by shoreline property owners would be subject to review by TVA for assessment of impacts on historic properties. Thus, no direct or indirect adverse effects to such resources or properties are expected.

**Alternative 3 – Applicant's Proposal With Mitigation Resulting From the Section 26a and Land Use Review** – The effects of adoption of Alternative 3 would not differ from those described in Alternative 2. Under this alternative, TVA would consult with Tennessee SHPO to incorporate a phased identification and evaluation procedure to effectively preserve historic properties.

#### **4.10 Effects on Floodplains**

**Alternative 1 - No Action** – Under Alternative 1, a permit for the community dock, boat launching ramp, or access road would not be issued; and TVA would not approve deed modifications to allow the construction of fill, 30 homes, and associated structures. Under this alternative, development of back-lying property above elevation 1044-foot msl would likely proceed, and TVA would consider future permit requests for individual private water-use facilities. Therefore, there would be no construction within the 100-year floodplain, and there would be no loss of flood control storage. If a residential subdivision were developed without federal authorization, it could be assumed that the main access road would be redesigned and located above the 1044-foot msl contour elevation. Requests could be considered for a community dock and ramp, and future Section 26a permits for individual water-use facilities would be received. Under EO 11988, water-use facilities are considered to be repetitive actions in the floodplain that generally result in minor floodplain impacts.

**Alternative 2 – Applicant's Proposal** – Among other facilities and amenities, the proposed project involves construction of a multiple-slip, floating, community dock; a boat launching ramp; a clubhouse/deck; and parking lot that would affect TVA shoreline or flowage easement land. Construction of the east (main) entrance road would involve the placement of about 5.8 acre-feet of fill within the flood control storage zone.

Under EO 11988, the community dock and boat launching ramp are considered to be repetitive actions in the floodplain that would result in minor floodplain impacts. Based on the plans and development description, all houses, the tennis courts, and clubhouse/deck would be constructed on land outside the 500-year floodplain, elevation 1035-foot msl. There would be no fill placed below elevation 1035-foot msl (within the flood control storage zone) for construction of these facilities. The borrow area for the fill would be located outside the 100-year floodplain. Therefore, this portion of the project would comply with EO 11988.

Construction of the east entrance road would involve the placement of fill within the limits of the 100-year floodplain and is, therefore, subject to compliance with EO 11988. Under EO 11988, fill for a road is considered to be a repetitive action in the floodplain that should result in minor floodplain impacts. Although construction of the entrance road would result in the loss of 5.8 acre-feet of flood control storage, the applicant has demonstrated that the project would comply with the TVA Flood Control Storage Loss Guideline by minimizing the amount of displaced flood control storage while achieving the project objective.

Overall, impacts to floodplains would be minor and insignificant. To prevent an increase in future flood damages, the following conditions would be included in the final Section 26a permit and land use approval or be included as commitments in this EA.

- The applicant would securely anchor all floating facilities to prevent them from floating free during major floods.
- Any future facilities or equipment subject to flood damage would be located above or flood-proofed to the 500-year flood elevation of 1035-foot msl.
- Any future development proposed within the limits of the 100-year floodplain, elevation 1032-foot msl, would receive additional approval from TVA.
- All future development would be consistent with the requirements of TVA's Flood Control Storage Loss Guideline.

TVA reserves the right to flood these tracts as needed during flood control operations.

**Alternative 3 – Applicant's Proposal With Mitigation Resulting From the Section 26a and Land Use Review** – Under Alternative 3, the minor and insignificant impacts on floodplains would be the same as those under Alternative 2.

#### **4.11 Effects on Prime Farmland**

Even though the site proposed for residential development is currently being used for agriculture, including the 14 acres subject to deed modification, completion of the "Farmland Conversion Impact Rating" is not required because none of the soils are classified as prime farmland. Implementation of any of the alternatives would have no direct impact on prime farmland causing no conversion of prime farmland to occur. The small amount of pasture to be converted to a non-agricultural use, in relation to the amount in the county (less than 2 percent), would be insignificant. Since the property contains no prime farmland, unique farmland, or farmland which has been designated by the state of Tennessee as being of state-wide importance, no adverse impacts to such resources are expected under Alternative 1, 2, or 3.

#### **4.12 Effects on Aesthetics and Visual Resources**

Since authorization is not required for activity above elevation 1044 msl, the Sunset Bay development would likely proceed under any of the 3 alternatives. Without TVA review and approval, the resulting effects would not be attributable to the proposed federal actions. If residential development occurs, TVA would consider future permit requests for individual private water-use facilities.

**Alternative 1 - No Action** – Under Alternative 1, a permit for the community dock, boat launching ramp or access road would not be issued; and TVA would not approve deed modifications to allow the construction of fill, 30 homes, and associated structures. Absence of approval for the community dock facility and parking area would have a positive effect by avoiding considerable shoreline discord and adverse contrast. No shoreline modifications, including riprap or facilities associated with the community dock and ramp area would be seen. Without a permit the entrance road would probably be relocated further uphill, but the visual impact would be negligible due to low public visibility.

Maintaining the existing restriction on structures and earth fills below elevation 1044 msl would have several consequences. The clubhouse/deck and parking lot facilities would probably be relocated to higher ground where public visibility would be greater. The restrictions would maintain the maximum visual setback between development and the shoreline. Setback width between elevation 1020 msl and 1044 msl averages about 230 feet, and varies from 45 feet to about 1220 feet. Two of the widest setbacks occupy major portions of the peninsulas where deed modifications have been requested for additional home sites. Retaining setbacks on these two areas would reduce visual impacts by holding development about 900 feet back from the main embayment. Fewer structures would be seen close to the water and the foreground distances from public viewpoints would be greater. Without construction in the setback areas more trees would likely remain to provide some screening and scenic interest. The pastoral character of these peninsulas would likely remain about the same. The distance would then provide a sense of scenic separation between future homes and potential public access along the waterfront.

Overall, this alternative would have the least severe visual impacts. It would reduce rather than add to the adverse effects expected from the planned subdivision, assuming the development proceeds on private land where federal approvals are unnecessary.

**Alternative 2 – Applicant’s Proposal** - Under Alternative 2, adverse visual impacts would be greatest. Changes resulting from the private residential development would be the same as previously described, while approval of the 26a application and requested deed modifications would result in additional negative impacts. Visual integrity, tranquility, and scenic value would be reduced even more, which would further degrade the aesthetic sense of place. Impacts would be visible from the same viewing points described in Section 3.12.

As proposed, the completed 336 slip community dock facility would occupy over 6 acres, virtually filling the small cove. Open slips with 336 light-colored boats, riprap, and various other structures would add visual discord and substantial visual congestion to the residential shoreline. The adverse contrast would be visible across the water for a couple miles to the southwest. The hillside parking area may have similar visibility when relatively full, due to the bright contrast of light reflecting off the automobiles. Trees and topography would block views of parking from the northwest. The completed clubhouse/deck and related facilities would probably be similar in scale and visual character to surrounding homes, so the appearance would be mutually compatible and contrast would be negligible. Impact of the completed entry road fill would be negligible, since it would look similar although somewhat larger than the existing drain crossing, and public visibility would be minimal.

Although there is considerable undeveloped shoreline on Norris Reservoir, adding 30 more home sites on the 2 peninsulas would have negative impacts. Development would extend at least 900 feet further to the reservoir and cover both peninsulas. As a result more structures would be seen at closer foreground distances from public viewpoints. Discordant contrast and visual congestion would increase. The attractive pastoral character of the setback area below elevation 1044 msl would be replaced with the large homes, and the clusters of trees may be removed down to the shoreline. The extensive alterations would be visually disruptive and dominate the appearance of the peninsulas. Visual separation distance between homes and potential public access would be substantially reduced.

Off-site borrow operations include heavy equipment activity, excavation, and airborne dust, would result in minor visual discord. Delivery trucks would increase visual congestion seen along the country road, which would increase with trip frequency. These impacts would be temporary, but possibly last 5 years or more until project construction and site reclamation are complete.

**Alternative 3 – Applicant's Proposal With Mitigation Resulting From the Section 26a and Land Use Review** - Without mitigation, the effects of development within TVA flowage easement land and other approved construction would be the same as described in Alternative 2. Under Alternative 3, visual mitigation measures would be incorporated in the proposed development plans to reduce and offset the negative impacts. The commitments listed below would help preserve some of the attractive rural landscape character seen from public viewing points and would reduce visual impacts along the shoreline. Public viewing points would be the same described in Chapter 3, Section 3.12.

- TN Emmons will establish greenbelt/shoreline management zones to protect and enhance existing tree cover along the Sunset Bay development, as described in items A and B below. In accordance with these requirements, language will be incorporated in the property sales agreements that will require new landowners to coordinate and obtain approval from the Architectural Review Committee of the Sunset Bay Homeowners Association before any trees are damaged or removed in the greenbelt areas.

A. The greenbelt includes the area between elevations 1020-foot msl and 1036-foot msl around the two peninsulas (Tract XNR-721, Parcels 2 and 3, within portions between TVA corners 66-11 and 66-16 and 66-1 and 66-2, respectively), in front of the property (totaling 14-acres) affected by the proposed deed modifications. In addition, for each of the 30 lots in the area of deed modification, TN Emmons will plant and maintain at least 12 native deciduous and evergreen trees at a ratio of 3:1. At planting, the deciduous trees will be at least 1.5 inch caliper and evergreens will be at least 6 feet tall. Where lots have existing trees, required trees will be used to supplement greenbelt planting on the other lots nearby. Tree planting will be done during Phase I of the overall development for maximum buffer growth prior to construction.

B. The greenbelt includes the areas between elevation 1020-foot msl and 1044-foot msl of Tract XNR-721 along Parcel 5 (between TVA corners 65-14 and 65-15), along Parcel 6, (between TVA corners 65-1 and 65-4), and along Parcel 1, from TVA corner 66-20R north to the end of the wooded shoreline (about Clinch River Mile 102.9). No tree planting would be required on these parcels.

- TN Emmons will plant and maintain a similar buffer of predominantly evergreen trees to permanently screen views of the community dock parking area from the reservoir area. Plants will be of sufficient size and spacing to fully screen the parking within three years after planting.
- TN Emmons will establish standards to use only darker tones of muted natural colors (e.g., dark gray-green, brown, black, etc.) for the structures and roofs associated with the community water-use facility.

TN Emmons' commitment to construct 100 fewer boat slips at the community dock would also reduce visual impacts.

#### 4.13 Effects on Noise

Since there is already considerable noise from boats on Norris Reservoir, the potential noise impact of any alternative would be due to the increase in the frequency of boat passes. The increase in noise levels (annual  $L_{dn}$ ) due to increased boat traffic was estimated by the equation: *increase in annual  $L_{dn} = 10 \log (1+B/100)$ , where B is the percent increase in boat count.*

**Alternative 1 – No Action** - Under this alternative, the 336-slip community dock boat (fronting Lost Creek) would not be permitted. However, approximately 270 private lot owners outside Sunset Bay and 239 waterfront lot owners within Sunset Bay could request permits from TVA for private water-use facilities along the shoreline in Areas A and B at some point in the future. This alternative is expected to result in approximately 49,083 boats per year using these areas (see Figure 9), an increase of approximately 31 percent. This additional boat traffic is expected to result in an annual  $L_{dn}$  of 58.4 dBA at Big Ridge State Park, an increase of 1.2 dBA. The annual  $L_{dn}$  100 feet inland from the shore is expected to be 6 to 10 dBA less than the value at the shoreline, due to the sound absorption of the trees. This increase in boat traffic would mean that boats would be heard more frequently than under existing conditions, but the annual  $L_{dn}$  would not exceed FICON's recommended levels for residential or recreational land use and the increase in annual noise levels would not cause an adverse impact on the noise environment.

**Alternative 2 – Applicant's Proposal** - Under this alternative, the 336-slip community dock boat would be permitted. In addition, approximately 270 private lot owners outside Sunset Bay and 239 waterfront lot owners within Sunset Bay could request permits from TVA for private water-use facilities at some point in the future. This alternative is expected to cumulatively result in approximately 56,710 boats per year using Areas A and B, an increase of approximately 51 percent. This additional boat traffic is expected to result in an annual  $L_{dn}$  of 59.0 dBA, an increase of 1.8 dBA. The annual  $L_{dn}$  100 feet inland from the shoreline is expected to be 6 to 10 dBA less, due to the sound absorption of the trees. This increase in boat traffic would mean that boats would be heard more frequently than under existing conditions, but the annual  $L_{dn}$  would not exceed FICON's recommended levels for residential or recreational land use and the increase in annual noise levels would not cause an adverse impact on the noise environment.

**Alternative 3 – Applicant's Proposal With Mitigation Resulting From the Section 26a and Land Use Review** - Under Alternative 3, TVA would only permit the 236 boat slips. The cumulative impact of the 236 boat slips and 239 private docks within Sunset Bay when added to 270 future private docks would result in approximately 54,445 boats per year using Areas A and B, an increase of approximately 45 percent. This additional boat traffic is expected to result in an annual  $L_{dn}$  of 58.8 dBA, an increase of 1.6 dBA. The annual  $L_{dn}$  100 feet inland from the shoreline is expected to be 6 to 10 dBA less, due to the sound absorption of the trees. This increase in boat traffic would mean that boats would be heard more frequently than under existing conditions, but the annual  $L_{dn}$  would not exceed FICON's recommended levels for residential or recreational land use and the increase in annual noise levels would not cause an adverse impact on the noise environment.

#### 4.14 Unavoidable Adverse Impacts

Selection of any of the alternatives would inevitably result in some minor, isolated, adverse environmental effects. The magnitude of these effects would be reduced by adoption of the mitigative measures under Alternative 3. Any development actions on the TVA flowage

easement land would create slight direct, indirect, and temporary increases in sediment, herbicides, and pesticides entering water courses; an increase in dust, boat, and vehicle emissions; an increase in noise; a loss of wildlife habitat and food sources; and changes in the visual landscape to a less natural appearance.

These adverse effects would be localized and limited to the TVA flowage easement land and the immediate vicinity. Some adverse effects, such as those related to construction, would cease or abate over time. Although such impacts would be difficult to totally eliminate, they can be minimized or mitigated to acceptable levels.

#### **4.15 Relationship of Short-Term Uses and Long-Term Productivity**

The relationship between short-term uses of the human environment and maintenance and/or enhancement of long-term productivity is complex and involves trade-offs and changes in environmental characteristics. Short-term uses are those that generally occur on an annual basis. Since the uplands of the TN Emmons property are currently under private ownership, short-term uses of the property would likely continue to be agricultural production. Some informal public recreation would likely continue along the shoreline. Nonforested, visual changes would result in long-term loss of a more natural shoreline setting to reservoir users; however, long-term productivity would occur from economic development and recreational and employment opportunities for residents, employees, and guests.

#### **4.16 Irreversible and Irretrievable Resource Commitments**

The fuel and energy used to create Sunset Bay would be irreversibly lost. Many of the construction materials also represent irreversible losses; however, some would be recycled during and after the life of the project. Neither the energy expended nor the construction materials used are expected to result in regionally or locally significant environmental effects. Also, given the abundance of similar land use/land cover types in the region, loss of wildlife habitat is not considered significant.

